Mathematical Astrology

CHAPTER 1
ASTROLOGICAL TERMINOLOGY -1

Under this topic 'Astrological Terminology' we propose to discuss and acquaint our students with various terms and their meaning, definition, etc. commonly used in astrology, particularly those used in mathematical Astrology. In addition, certain astronomical terminology will also be discussed in these lessons, to the extent these are used in mathematical astrology. The various terminology with which the students are expected to be familiar are as follows

1. The solar system.
2. The earth
3. The equator of the earth
4. Northern hemisphere, and southern hemisphere.
5. Geographical longitudes (Rekhansha) & Geographical latitudes (Akshansha)
6. Meridian of Greenwich as reference point at the earth's equator
7. Celestial sphere or the cosmic sphere
8. Celestial poles
9. Celestial Equator
10. Ecliptic or the Ravi Marga
11. Zodiac
12. Celestial longitude (Sphuta)
13. Celestial latitude (Vikshepa)
14. Declination (Kranti)
15. Right ascension (Dhruva)
16. Oblique ascension or Rashimaan
17. Equinoctial points
18. Precession of the equinoxes and Ayanamsha
19. Moveable and fixed zodiacs
20. The Sayana and Nirayana system
21. The Table of Ascendants
22. The Table of Houses
23. The Ephemeris

We will now take the above mentioned terms and discuss these one by one so as to make these terms clear to the students. It may however be mentioned here· that a large number of the above mentioned terms are quite simple and self explanatory. Most of the students, particularly those who have studied the geography as a subject during their school education, would be familiar with the terms mentioned above. Nevertheless we. will discuss and explain all the above mentioned terms in a systematic manner so that the very concept of these terms is understood by the students.

1. The Solar System

Our Solar System is centered round the Sun. Nine planets viz. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus (or Herschel), Neptune and Pluto alongwith belt of Asteroids revolves in elliptical orbits around the Sun.

In Hindu Astrology, the last three planet i. e. Uranus (or Herschel), Neptune and Pluto have no place. On the other hand the classical Hindu Astrology recognizes the Moon and the two shadowy planets i. e. Rahu and Ketu (or the Moon's Nodes) as equivalent to planets. Rahu and Ketu are not physical bodies but are mathematically calculated sensitive points of intersection of the orbits of the Moon and the Sun (or in fact that of the Earth but which appears to be that of the Sun).

1.1 The planets Mercury and Venus are situated in the space between the Sun and the Earth. These planets are therefore known as 'Inner Planets'. These are also known as 'Inferior Planets'.

Figure 1

1.2 The other three planets namely Mars, Jupiter and Saturn are so situated in the space that their orbits are on the outer side of the EaI1h. These Planets are therefore known as 'Outer Planets' or 'Superior Planets'.

2. The Earth

The Earth is ever spinning on its axis. In addition to its spinning, the earth is also revolving round the sun. It is therefore always in a state of motion in the space at a speed of nearly 30 kms per second or 1,600 kms a minute or 96,60,00,000 kms per year.

2.1 In early times, the earth was believed to be the centre of universe or our solar system. It was thought that the Sun, the Moon and other planets (stars) actually revolved around the earth, as they appear to do. But now we know that the earth is a globe, that it rotates or spins on its axis and the Sun and stars appear to revolve around it from east to west, because the earth is revolving around its axis from west to east. This phenomenon can be best explained with the example of a moving train. When we look out side the window from a running train, the trees at a distance or the telephone poles, electric posts and other similar objects appear to be moving in the opposite direction to that of the train, which actually is not correct. We know that the trees, the telephone poles, the electric posts etc., all are fixed at a place. Similarly living on the earth's surface, we also keep on moving in the space with the same speed as that of the earth. The sun which is actually stationary would appear to us to be moving in the opposite direction to that of the earth. As the earth is moving from west to east, the Sun and other stars in the space will appear to be moving in the opposite direction i. e. from east to west. This is what we actually observe also.

2.2 The axis of the Earth slants at an angle of about 231;i° from the perpendicular to the plane of its orbit. If the plane of orbit of earth is treated as horizontal, then perpendicular to this lane will be known as vertical and then the axis of earth can be stated to be slanting at an angle of about $231;2^0$ (23 degrees 28 minutes to be precise) to the vertical.

Figure 2

The axis of the earth is so inclined that the northern end of the axis always points to the Pole Star or commonly known as Dhruv Tara. Where the northern and southern end of the axis of earth meet the surface of the earth, those points are known as North and South Poles of the earth, respectively.

3. The Equator of the Earth

If we draw a plane passing through the centre of the earth and perpendicular to the earth's axis, it will cut the surface of the earth in a circle. This great circle on the surface of the earth is known as the Earth's Equator or terrestrial Equator.

Figure 3

4. Northern and Southern Hemisphere

We know that the globe of the earth is not a perfect sphere like a ball. In fact the earth's diameter along the equator is larger than its diameter along the axis due to the fact that the earth is slightly flattened at the poles where as it is slightly bulging out at the equator. The shape of the Earth is comparatively more similar to that of an orange or a melon rather than that of a perfect sphere. Even then, for easy comprehension/calculations and understanding the various phenomenon, we consider the earth's globe to be a perfect sphere, though it is actually not so. In Para 1.6 above we have seen that the imaginary plane cuts the earth's surface in a great circle known as earth's equator. However, if the same plane was to cut the earth's globe (or the sphere) into two parts, each part will be exactly half of the sphere and will therefore be known as the Hemisphere. The hemisphere towards the North end of the axis of the earth is known as Northern Hemisphere. Similarly the hemisphere towards the south end of the axis of the ea11h is known as Southern Hemisphere. Figure 4 illustrates the above phenomenon clearly where in the two halves of the earth's globe have been shown separated at the plane of the earth's equator.

Figure 4

5. **Geographical Longitudes (Rekhansha) and Geographical Latitudes (Akshansha)**

In order to fix the position of an object or a point on a plane, we have to divide the plane by drawing two sets of parallel lines at equal intervals perpendicular to each other. A graph paper which all of us would have used in our school days, is a good example to understand this phenomenon. In the adjacent figure 5 we have two sets of parallel lines which are at equal intervals and at the same time are perpendicular to each other, i. e. to say that all lines in N-S direction are perpendicular to all the Lines in W-E direction. Similarly all lines in W-E direction are parallel to each other but perpendicular to the lines in N-S direction. 'With the help of these equidistant parallel and perpendicular lines, we can correctly find the coordinates of any given point viz. A, B, C or D with reference to any given point of reference (say '0'). For example:

For 'A' we can say 7 units in E direction and 7 units in N direction.
For 'B' we can say 6 units in W direction and 5 units in N direction.
For 'C' we can say 8 units in W direction and 8 units in S direction. and similarly
For 'D' we can say 4 units in E direction and 5 units in S direction.

Figure 5

Alternatively, if the coordinates of any point are known, we can locate the point exactly on the plane by counting the number of units indicted by the coordinates, in the appropriate direction. The same concept is applied to the earth's surface also with slight modifications as the surface of the earth is not a perfect plane but is having curvature, the earth's globe being a sphere for all practical purposes.

5.1 The surface of the earth's sphere is imagined to be cut by several planes each one of them passing through the centre of the earth and perpendicular to the plane of Earth's equator. These planes will describe imaginary circles on the surface of the earth so that each one of these imaginary circles will be passing through the North as well as the South pole of the earth and will have the same centre as that of the earth. The distance measured along the surface of the earth between any two such consecutive circles will be zero at both the poles (as all the circles will be passing through the poles) and will be maximum at the equator. These circles are known as the 'Meridians of Longitude'. These have been explained in the figure 6.

Figure 6

5.2 Again let us imagine the surface of the earth to be cut by imaginary planes which are all parallel to the plane of earth's equator. These planes will also describe circles on the surface of the earth and the centres of all such circles will be falling on the axis of the earth and each one of these circles will be parallel to each other as well as parallel to the earth's equator. These circles are known as parallels of Latitude.

5.3 Students will recall that the 'meridians of longitudes' are nothing but concentric circles on the surface of the earth whose planes are all perpendicular to the plane of equator. Similarly, the 'parallels of latitudes' are again circles on the earth's surface but with their planes parallel to the plane of earth's equator. It is therefore self evident that at any given point on the surface of earth, the meridian of longitude and the parallel of latitude will be mutually perpendicular to each other and will therefore intersect each other at right angles or 90°.

5.4 Students are advised to re-read Para 1.8.1 to 1.8.3 above so that the application of the concept of 2 sets of equidistant parallel lines, each set being mutually perpendicular to the other set (Para 1.8) could be properly understood by them to locate or identify any place or city on the surface of the earth.

Figure 7

5.5 We have already seen that the earth's equator is a circle. As any circle comprises of 3 60° of arc so the earth's equator will also have 360°. For easy comprehension, we may imagine that there are 180 numbers of concentric circles drawn on the surface of earth in such a way that their planes. are perpendicular to the plane of earth's equator. These 180 circles will describe 360 lines on the surface of earth (each circle will give two lines i.e. one in the front and the other at the back) which as we already know (Para 1.8.1) are known as meridians of longitudes. Each of these 360 meridians of longitude will pass from both the poles of the earth and at equator will be 1 ° apart. The distance between any two consecutive lines measured along the surface of earth will be maximum at earth's equator which will go on decreasing as we proceed along these lines either towards North Pole or towards the South Pole where it will become 'Zero'.

5.6 We may also consider for easy comprehension that the circles which are known as the Parallels of Latitude are also 180 in numbers i. e. 90 circles in the Northern Hemisphere and the remaining 90 circles in the southern Hemisphere so that the angular distance (angle substanded at the centre of earth) between any two consecutive circle is 1^0 again as in the case of Meridians of the longitudes. We will therefore, have a set of parallel lines at 1^0 angular distance apart running from E to W or W to E around the earth's globe all of which will be perpendicular to the Meridians of longitude (para 1.8.3).

5.7 We can now super-impose the figures 6 and 7 and see that the new figure formed by merging or superimposing the two figures will have a graph like appearance drawn on the surface of the earth which by and large will be somewhat similar to figure 5. The only exception will be that the lines in N-S

direction or the Meridians of longitudes will not be eactly parallel to each other in the true sense. However as the students may be aware that earth's globe has a circumference of about 40,232 kms or 25,000 miles (approx.), the space of earth's surface covered between two consecutive lines of 1^0 angular distance in N-S as well as E-W directions will be roughly of the order of 110 kms x 110 kms or 69 miles x 69 miles. Hence we may consider them to be parallel for the place or city under consideration.

Figure 8

5.8 From the figure 8 above though it is clear that the meridians of longitudes are never exactly parallel in the strict sense, but as explained in para 1.2.5.7 for the limited spaces marked as 'A', 'B', and 'C' on the earth's surface these meridians (shown by dotted arrows in the figure) are considered as parallel. Therefore the conditions of figure 5 in para 1.2.5.8 above are considered to have been fulfilled.

5.9 Having drawn 2 sets of parallel lines at equal distance which are mutually perpendicular also, we are now set to locate any place on the surface of earth. We now only need to know its coordinates from a given reference point. In the context of earth's globe these coordinates are known as 'geographical longitudes' which are measured along the earth's equator either towards 'East' or 'West' from the reference point/line. The other coordinate being the geographical latitudes which are measured in perpendicular direction from earth's equator either towards 'North' or 'South' from the reference point or line. For the purpose of longitudes, the reference line or the reference meridian has been chosen as the meridian passing through Greenwich near London. This meridian i.e. the meridian passing through Greenwich is considered as 0° longitude and the longitudes of all other places on earth is measured with reference to this meridian only either towards East or towards West. Hence all places, cities etc. on the surface of earth are located within either 0^0E to 180^0E longitude or 0^0W to 180^0W longitude. Similarly for the purposes of latitudes the reference line or parallel of latitude is the equator itself. The latitudes of all places, cities etc. situated on the surface of the earth are measured from the equator whose latitude is 0°, either towards North or South depending on whether the place is in Northern or Southern Hemisphere. Hence the latitudes vary from 0^0N to 90^0N for places in Northern Hemisphere and from 0^0S to 90^0S for places situated in Southern Hemisphere. Thus the point of intersection of 0° longitude i.e. the Meridian of Greenwich with the Earth's Equator is considered as the reference point 'O'

5.10 Students would have seen that the explanation for Geographical longitudes and latitudes have been dealt with in much greater detail and is quite exhaustive in its content. If the phenomenon is clear with reference to the earth's globe, students will find it easy to understand when the same is applied to the space and the planets, which is of our primary concern while talking about the Astrology.

CHAPTER 2
ASTROLOGICAL TERMINOLOGY II

2.1 In the previous chapter we have seen how to locate or define a place on the earth's surface. We will now apply the similar principles to the space and see how to locate or define the position of various planets situated in the space. For this purpose, we will have to imagine that the entire space around our planet earth is a huge sphere with infinite diameter which extends far beyond the farthest of the planets with which we are concerned in Astrology. So living on this planet earth, the other planets in the space including the sun and the Moon would appear to us to be situated on the imaginary surface of this imaginary sphere.

2.2 Celestial Sphere or the Cosmic Sphere
The imaginary sphere in the space surrounding our entire Solar system, mentioned in Para 2.1 above, is known as the celestial sphere or the cosmic sphere.

2.3 Celestial Poles
If the Earth's axis is extended infinitely towards North and South, it will meet the imaginary surface of the cosmic sphere or the celestial sphere at some point. These points on the surface of cosmic sphere are known as the Celestial Poles and the extended axis becomes the imaginary axis of the celestial sphere.

2.4 Celestial Equator
The projection of earth's equator or the terrestria equator on the imaginary surface of the celestial sphere is known as the Celestial Equator.

2.4.1 As the earth's equator divides the earth's globe into two halves, similarly the celestial equator divides celestial or cosmic sphee into two equal halves or hemispheres. These are known as Northern celestial hemisphere and the Southern celestial hemisphere.

2.5 Ecliptic (Ravi Marg)
The apparent path of the Sun in the space along which it seems to move around the earth is known as Ecliptic. This is also known as Ravi Marg. The Ecliptic or the Ravi Marg, like the orbits of other planets is not a circle but is elliptical or oval in shape. Ecliptic can also be defined as a projection of Earth's orbit around the Sun on to the surface of cosmic sphere. The plane of Ecliptic is inclined to the plane of celestial equator at an angle of about 23~ ^{0} due to the slant! inclination of the earth's axis to the vertical. Figure 9 given below will clarify the position.

Figure 9 of book

2.6 Zodiac
If one observes the movement of planets, it is seen that they also move in their own orbits along with the Sun's path, but their path deflects north-south also. However the planets never proceed more than 9° either north or south of the ecliptic. Hence if a parallel line on either side of the ecliptic is drawn at an angular distance of about 9° then the ecliptic will come in the middle and either side will be a broad band/path way in which all planets can be located. This imaginary belt/band stretching about 9° north and 9° south of the ecliptic within which the planets and the Moon remain in course of their movement in the heavens, is known as Zodiac. In astrology we refer to this broad band of 18 ° instead of referring to the entire sky.

2.7 Celestial Longitude (Sphuta)
This is the arc of the ecliptic intercepted between the first point of Aries (Nirayana) and a perpendicular arc to the ecliptic drawn through the body (planet) and the poles of the ecliptic. In other words it can also

be defined as the angular distance of any heavenly body (viz. planets etc.) measured in degrees along the ecliptic, in one direction from the origin (or the reference point - **first point of Aries of the zodiacal sign or the vernal Equinox).** The first point of Aries is different in **Sayana** and **Nirayana** system. Students will recall that in the case of Geographical longitudes, the measurement was along he terrestrial equator and it was either towards east or west from the Greenwich or the reference point or 0° longitude so that the maximum longitude of any place on the surface of earth could be either 180^0E or 180^0W. However in the case of **Zodiac or to say the celestial sphere, the measurement of celestial longitude of any planet is in one direction** only from the origin or the reference point. As such the celestial longitudes of various planets will be from 0° to 360° and in this case there is nothing like measuring towards east or west.

2.8 Celestial Latitude (Jlikshepa)
It is the angular distance across the celestial sphere measured north or south from the ecliptic along the great circle passing through the poles of the ecliptic and the object.

2.9 Declination (Kranti)
It is the angular distance on the celestial sphere north or south of the celestial equator. It is measured along the hour circle passing through the celestial object.

2.10 Right Ascension (Dhruva)
It is the angular distance on the celestial sphere measured eastward along the celestial equator from the vernal equinox to the hour circle passing through the celestial object.

2.11 It is considered necessary here to clarify the position to the students with regard to Para 2.7 to 2.10 above. While dealing with places on the surface of the earth we had only one system of coordinates viz. geographical longitudes in East-West direction and geographical latitudes in North-South direction. However in the case of heavenly bodies like planets etc., we have two different systems of coordinates. The first system of coordinates i.e. celestial longitudes and latitudes is normally followed by the Astrologers where as the other system i.e. Right Ascension and Declination is followed by the Astronomers. In spite of there being two systems, the methodology adopted is by and large the same as is applicable to geographical longitudes and latitudes except that in the two systems mentioned above in context of celestial sphere the measurements along the Ecliptic as well as the celestial equator are unidirectional unlike towards east or west in the case of earth's equator.

2.12 Secondly in the first system which is followed b . the Astrologers (celestial longitudes and celestial latitudes the measurements are along and perpendicular to the Ecliptic where as in the second system adopted by Astronomers i. e. Right Ascension and declination, the measurements are along and perpendicular to the celestial equator. The figure give below will make the point clear to the students.

Figure 10 of book

Students may please see the figure 10 carefully. It depi a cosmic sphere or a celestial sphere on the surface of which a heavenly body e.g. Planet ‘P’ is situated. The other constituents of the figure are:

(a) WOE	Celestial equator
(b) W_1OE_1	Ecliptic
(c) N and S	North and South poles of t celestial sphere or of the celestial equator.
(d) N_1 and S_1	North and South Poles of Ecliptic.
(e) NPP_2S	One side of the great circle (or the hour circle or circle of declination) passing

	through the planet P, and Poles N and S, perpendicular to the celestial equator and· intersecting it at point P_2
(f) $N_1PP_1S_1$	One side of the great circle passing through the Planet P Poles $N_1$and S_1 of the Ecliptic and perpendicular to it (Ecliptic) and intersecting the ecliptic at P_1
(f) OP_1	Is the angular distance measured along the ecliptic or we can call this as Celestial longitude of planet P.
(h) PP_1	is the angular distance measured perpendicular to the ecliptic. It is the celestial latitude of Planet P. As P is situated above the ecliptic in the Northern hemisphere the celestial latitude will be North.
(i) OP_2	it is the angular distance measured along the celestial equator. It is therefore right ascension of planet P.
(j) PP_2	It is the angular distance measured perpendicular to the celestial equator. It is therefore declination of Planet P. As the planet P is situated In the northern hemisphere, the declination 'of the planet will be North.

2.13 Oblique Ascension (Rashimaan)

Rashimaan means the rising periods of each of the twelve rashis or signs of the Zodiac. It is the time required taken by each Rashi to rise completely through its 30 degrees on the eastern horizon of any place on earth. The Rashimaans vary from Akshamsha to Akshamsha. These are always given in Sayana system i. e. to say that the time of oblique ascension is computed for the signs of moveable Zodiac. For the present studens may remember the definition only. We will revert back to the subject when dealing with the traditional method of casting the horoscope.

CHAPTER 3

ASTROLOGICAL TERMINOLOGY III

3.1 Equinoctial Points

In the celestial sphere the ecliptic intersects the equator at two points because the Sun crosses the celestial equator twice a year. These two points are known as Equinoctial points or Equinoxes, because when Sun is at either of these two points, the duration of day and night on earth will be equal.

3.1.1 When the sun crosses the celestial equator on its way from southern hemisphere to northern hemisphere that equinoctial point is known as the Spring or Vernal equinox. At that time the 'Sayana' longitude of the sun is 0°. Similarly when the Sun, continuing its sojourn of the heavens again crosses the celestial Equator on its way from northern hemisphere to southern hemisphere, that Equinoctial point is known as Autumnal Equinox. At that moment the Sayana longitude of the sun is 180°. Now-a-days the Sun is at Vernal Equinox on or around 21st March and at Autumnal Equinox on 23rd September, each year.

3.2 Precession of the Equinoxes

It has been observed and can be proved mathematically that the vernal equinox or the first point of Aries from where the longitudes (Sayana or Tropical) of all the planets are measured along the ecliptic is not a fixed point. Each year when the Sun reaches the vernal equinox, the position of earth with reference to some fixed star shifts by 50*1/3*" of arc west wards compared to position at equinoctial moment of the previous year. Therefore the vernal (Equinox (VE.) point is receding back along the ecliptic at the rate of about 50*1/3*" per year. This slight retrograde motion of the equinoxes is known as the precession of the equinoxes.

3.3 Moveable and fixed Zodiacs

Due to precession of equinoxes, the V.E. slips backwards from its original position (recognised as star Revati by the Hindus). The Zodiac which reckons the first degree of Aries (Mesha) from the VE. (which has a precession every year) is known as the Moveable Zodiac, while in the case of the Fixed Zodiac, the first degree of Aries (Mesha) is reckoned from a particular star in the Revati group of stars, which is fixed.

3.4 Ayanamsha

The angular distance measured along the Ecliptic, between the first point from where the fixed Zodiac commences and the VE. point, at an Epoch is known as Ayanamsha. The exact period when the point of beginning of both the Zodiacs i. e. the Moveable Zodiac and the Fixed Zodiac coincided, is not known. Accordingly the Ayanamsha or the precessional distance varies from 19^0 to 24^0. A number of dates are given as the year of coincidence. However, we follow the year as given by N.C. Lahiri in his Ephemeries i.e. 285 AD. which is same as adopted by the astronomical observatories all over India.

3.5 The Sayana and Nirayana Systems

The system of Astronomy which recognises the Moveable Zodiac, belongs to Sayana school while that which considers the fixed zodiac is termed as the Nirayana system. The Sayana system is used by the western astrologers where as the Hindu Astrologers use the Nirayana system. There are different names prevalent for the two types of Zodiacs which are as follows:

(a) Moveable Zodiac is also known as Tropical Zodiac, Sayana Zodiac and the Zodiac of Signs.

(b) Fixed Zodiac is also known as Sidereal Zodiac, Nirayana Zodiac and the Zodiac of Constellations.

3.6 Determination of Approximate Ayanamsha

Though we must always use the Ayanamsha for any Epoch as given in the Ephemeries of N.C. Lahiri, we can roughly work out the value of Ayanamsha by following the method given below:

(a) Subtract 285 from the year of the birth or the given year (A.D.)
(b) Multiply the remainder by 50 X " and reduce the product into degrees, minutes and seconds.

Example: Ayanamsha for the year 2002 can be worked out as follows :
2002 - 285 = 1717
Multiply by 50 1/3" = 1717 x 50 1/3" = or 86422.33"
Approximate Ayanamsha = 24°-0'-22".33

3.7 Sign

The zodiac consists of 360 degrees. This is divided into 12 equal sectors each of 3 0° and each sector is called a 'Sign' or a 'Rashi'. The twelve signs/rashis of the zodiac their Names, Lords, etc. are as follows:

No.	Sign	Rashi	Extent	Lord of sign
1.	ARIES	MESHA	0° to 30°	MARS
2.	TAURUS	VRISHA	30° to 60°	VENUS
3.	GEMINI	MITHUNA	60° to 90°	MERCURY
4.	CANCER	KARKA	90° to 120°	MOON
5.	LEO	SIMHA	120° to 150°	SUN
6.	VIRGO	KANYA	150° to 180°	MERCURY
7.	LIBRA	TULA	180° to 210°	VENUS
8.	SCORPIO	VRISCHIKA	210° to 240°	MARS
9.	SAGITTARIUS	DHANU	240° to 270°	JUPITER
10.	CAPRICORN	MAKARA	270° to 300°	SATURN
11.	AQUARIUS	KUMBHA	300° to 330°	SATURN
12.	PISCES	MEENA	330° to 360°	JUPITER

3.8 Nakshatras or Stars/Constellations

The Hindus have yet another division of the Zodiac. In this system the entire zodiac is divided into 27 equal parts of i3°20' each. These divisions are called Nakshatras or stars or Constellations or Asterisms. Their names, extension in the zodiac, their lords etc. are as follows :

S.No.	Name of Nakshatra	Extent (Longitude)	Extent Sign/Rashi	Lord of Nakshatra /No. of Years in Constellations Vimshottari Dasha
1.	Ashwini	0° to 13°20'	Mesha 0° to Mesha 13°20'	KETU 7
2.	Bharani	13°20' to 26°40'	Mesha 13°20' to Mesha 26°40'	VENUS 20
3.	Krittika	26°40' to 40°	Mesha 26°40' to Vrisha 10°	SUN 6
4.	Rohini	40° to 53°20'	Vrisha 10° to Vrisha 23°20'	MOON 10
5.	Mriga~hira	53°20' to 66°40'	Vrisha 23°20' to M:ithuna 6°40'	MARS 7
6.	Ardra	66°40' to 80°	Mithuna 6°40' to Mithuna 20°	RAHU 18
7.	Punarvasu	80° to 93°20'	Mithuna 20° to	JUPITER 16

			Karka 3°20'		
8.	Pushya	93°20' to 106°40'	Karka 3°20' to Karka 16°40'	SATURN	19
9.	Ashlesha	106°40' to 120°	Karka 16°40' to Karka 30° or Simha0o	MERCURY	17
				TOTAL	120
10.	Magha	120° to 133°20'	Simha 0° to Simha 13°20'	KETU	7
11.	Poorva Phalguni	133°20'10 146°40'	Simha 13°20' to Simha 26°40'	VENUS	20
12.	Unra Phalguni	146°40' to 160°	Simha 26°40' to Kanya 10°	SUN	6
13.	Hasta	160° to 173°20'	Kanya 10° to Kanya 23°20'	MOON	10
14.	Chitra	173°20'10 186°40'	Kanya 23°20' to Tula 6°40'	MARS	7
15.	Swati	186°40' to 200°	Tula 6°40' to Tula 20°	RAHU	18
16.	Vishakha	200° to 213 °20'	Tula 20° to Vishchika 3°20'	JUPITER	16
17.	Anuradha	213°20' 10 226°40'	Vrishchika3°20'to Vrishchika 16°40'	SATURN	19
18.	Jyeshtha	226° 40' to 240°	Vrishchika 16°40' to Vrishchika 30° or Dhanu 0°	MERCURY	17
				TOTAL	120
19.	Moola	240° to 253°20'	Dhanu 0° to Dhanu 13°20'	KETU	7
20.	Poorvashadha	253°20' to 266°40'	Dhanu 13°20'to Dhanu 26°40'	VENUS	20
21.	Unrashadha	266°40' to 280°	Dhanu 26°40' to Makara 10°	SUN	6
22.	Shravana	280° to 293°20'	Makara 10° to Makara 23°20'	MOON	10
23.	Dhanishtha	293°20' to 306°40'	Makara 23°20' to Kumbha 6°40'	MARS	7
24.	Shatahhisha	306°40' to 320°	Kumbha 6°40' to Kumbha 20°	RAHU	18
25.	Poorva Bhadra	320° to 333°20'	Kumbha 20° to Meena 3°20'	JUPITER	16
26.	Uttra Bhadra	333°20' to 346°40'	Meena 3°20' to Meena 16°40'	SATURN	19

27.	Revati	346°40' to 360°	Meena 16°40' to Meena 30° or Mesha 0°	MERCURY	17
				TOTAL	120

3.9 Ascendant or Lagna

The ascendant or the lagna point is the point of intersection of the ecliptic at the given time with the horizon ofthe place. In astrology it is the first house of the horoscope. This point of intersection is very important as it is considered to be the commencing point of the horoscope. The earth rotates on its axis from West to East in about 24 hours. Due to this rotatory motion the whole sky (Zodiac) appears to come up from below the horizon gradually. The Ascendant or the Lagna is the 'Rising sign' in the eastern horizon. The period of each lagna is not equal like the rashi or the sign division. As all the 12 rashis or signs must rise one after the other in a day (due to rotation of earth on its axis once a day) each rashi/sign becomes the lagna one after the other consecutively, with the passage of time. The names of the lagnas or the Ascendants are the same as that of the rashi/sign rising at any given time.

3.10 The Tenth House or M.C.

The point of intersection of the ecliptic with the meridian of the place, at any time, is the 'tenth house' for that moment. It is also known as the Mid-heaven or Medium Coeli (M.C) and also known as meridian. The longitude of this point is, as usual, measured along the ecliptic from the first point of Aries. The right ascension of the Me is the sidereal time of the moment which is often called R.A.M. C

3.11 The Table of Ascendants

This is a small book containing several tables for use in casting a horoscope. One such book commonly used by the students of astrology is by N. C Lahiri. This gives the sidereal time at Noon for the central station of India or for the standard Meridian for India (longitude 82° 30'E) for the year 1900 and for each day of the year. It also contains tables for correction to be applied for different years and different places so that we can find out the sidereal time for any day of any year for all the places on earth. Then this book gives the tables for the different Ascendants (the degree and sign of the ecliptic) rising for every 4 minutes interval of Sidereal Time for different latitudes on the earth (0° North to 60° North). In our lessons we will be making extensive use of this book. We shall therefore advise our students to purchase a copy of this book (Tables of Ascendants) for their use.

3.12 The Table of Houses

This also is a small book like Tables of Ascendants. This is available in Nirayana as well as Sayana systems. It gives the longitudes of the 10th, 11th, 12th, 1st (Ascendant), 2nd and 3rd cusps (Midpoint of a house according to Hindu system and beginning of a house according to the western system of astrology) for different latitudes and sidereal time. With the help of this book one can directly note down the longitudes of the aforesaid six houses and by adding 180° or 6 signs to those longitude, the longitudes of the remaining six houses i.e. 4th, 5th , 6th, 7th, 8th and 9 th house can be found out. However since we follow the method of house divisions as given by sage Parashara, the tables of ascendants mentioned in para 3.11 will meet the requirements and there would be no need to buy the table of houses.

3.13 The Ephemeris

This is nothing but a modern Panchang. It is available in book form. It tabulates the positions of celestial objects (planets etc.) in an orderly sequence for one complete year (for the current years) . condensed Ephemeris are available for the past years. In these lessons we shall be following the Indian ephemeris of N.C. Lahiri, published by Astro Research Bureau, Calcutta. Students are therefore advised to have with them complete set of these ephemeris.

3.14 We have so far discussed about the Astrological Terminology commonly used in Mathematical Astrology. However in addition to the Terms discussed so far we will come across some more terms which will be discussed at the appropriate place, as we proceed further with our lessons.

CHEPTER -4

Time Measurement

4.1 The time is measured in hours, minutes, seconds and fractions of second in the western system which is now commonly used in India and other countries of the world. However the division of time is peculiar to 'Hindus'. It begins with a Tatpara and ends in a kalpa. A kalpa is equal to 4,320,000,000 sidereal years. The Hindu day (an apparent solar day) begins from Sunrise and ends with the next sunrise when the next day begins.

4.2 The Hindu division of time is as under:

60 Tatpara	= 1 Para
60 Para	= 1 Vilipta
60 Vilipta	= 1 Lipta (or Vilipta)
60 Lipta	= 1 Vighati (or Pala)
60 Vighati	= 1 Ghati = 24 minutes
60 Ghatis	= 1 Day = 24 hours

4.3 Again a Hindu measure of time is in terms of 'Yuga'.
The details are as under :

1st Yuga	Sat Yuga	= 17,28,000 sidereal years
2nd Yuga	Treta Yuga	= 12,96,000 sidereal years
3rd Yuga	Dwapar Yuga	= 8,64,000 sidereal years
4th Yuga	Kali Yuga	= 4,32,000 sidereal years

Total of 4 Yugas or 1 Mahayuga = 43,20,000 sidereal years

1 Kalpa	= 1,000 Mahayuga
	= 43,20,000 x 1000
	= 43,20,000,000 Sidereal years. 2 Kalpa
1 day of Brahma	= 2 kalpa (i.e. 1 Kalpa day and 1 kalpa night)
1 years of Brahma	= 360 x 2 Kalpas
1 Year of Brahma	= 720 Kalpa
Aayu of Brahma	= 1,000 Brahma Varsha.

4.4 Sidereal Day
This is the time taken by the earth to rotate once on its axis with reference to any fixed star. This is known as Nakshatra Dina among the Hindus and is equal to 23 hrs. 56 min. (approx.) of 'Mean solar day'.

4.5 Sidereal Year
The Sidereal year is the mean period of revolution of the earth in its orbit with respect to the background stars (from fixed star to fixed star).

4.6 Apparent Solar Day
This is also known as 'Savana Day'. This is longer than the 'Sidereal Day' by about 4 (four) minutes. According to Surya-Sidhanta Savana day is reckoned from sunrise to next sunnse.

4.7 Mean Solar Day
This is reckoned by considering the average length of all the days in a year.

4.8 Months
There are two types of months in vogue in Hindus which are as follows :

(a) Lunar Month or Chandra Maan : It has 30 lunar days or Tithis and is measured from New Moon to next new Moon. At some other places it is measured from Full Moon to next Full Moon.
(h) Solar Month or Saur Maan : It is the time the Sun takes to move in one sign and is measured from one Sankranti to the next Sankranti.

4.9 Years

In Hindus there are three types of different years in vogue which are as follows.
(a) The Savana year: It has 360 mean solar days
. (h) The Lunar year : It has 354 mean solar days
(c) The Nakshatra year: It has 324 mean solar days

4.10 Tropical Year

The Tropical Year or the year of seasons, is the time a the passage of the sun from one Vernal Equinox to the next Vernal Equinox. The VE. point slips to the west at the rate 0 50 1/3 per year.

4.11 Anomalistic Year

The anomalistic year is the mean interval between successive passages of the earth through perihelion. Perihelion is the point on a planetary orbit (in this case earth) when it ; at the least distance from the Sun.
4.12 The lengths of different years mentioned in pa: 4.5,4.10 and 4.11 above, according to modern calculation given by Dr. B. V Raman in his book A Manual of Hindu Astrology) are as follows:

Year	Length			
	D	H	M	S
The Tropical year	365	5	48	45.6
The Sidereal Year	365	6	9	9.7
The Anomalistic Year	365	6	13	48

CHAPTERS- 5

TIME DIFFERENCES

5.1 Students are aware that the Sun is the creator of time, day and night and the seasons. A Hindu day commences from the sunrise and remains in force till the next sunrise, when the next day commences. When the sun is exactly overhead it is called Mid day or Local noon. At the moment of sunrise for any place, the local time for that place is Zero hour (or Ghati) as per traditional Hindu system of reckoning the time. However as the earth is not a flat body but spherical and also rotating on its axis, the Sun rises at different times at different places. As the rotation of the earth on its own axis is from west to east, it is evident that the eastern part of the earth will see the Sun first, and due to the rotation of the earth, further western parts of the earth moves towards east gradually and see the Sun. This process goes on and on. In other words, as we live on this planet earth we do not see or feel the rotation of the earth from west to east, but we see that the Sun rises in the east and gradually comes over head and then sets in the west.

5.2 Local Time

We have seen above that the eastern parts of the earth will see the Sun first and subsequently as more and more western parts move to east due to rotation of earth, those parts will also gradually see the Sun. In other words it means that the Sun will rise later at a particular place as compared to a place towards east of the earlier place. It therefore implies that Zero hour of the day will commence earlier at a place which is in the east of another place where the Zero hour of the day will commence later. Similarly the Noon time or the Mid day will occur earlier in the eastern part Of the earth as compared to any place towards west of the earlier place. We know that earth complete one full rotation (360°) on, its axis in about 24 hours or 24 x 60 = 1440 minutes. It simply means that Earth will take about 1440/360 = 4 min. to rotate by 1 ° on its axis. We can therefore conclude that Zero hour at a place' B' which is 1 ° towards west of place 'A' will commence later by 4 minutes as compared to place 'A'. So the local time differs from place to place 'A". Strictly speaking as neither the earth is a perfect sphere nor its orbit around the Sun is a perfect circle and as also the axis of earth is inclined by about 231/2 ° to the perpendicular to the plane of earth's orbit, even the duration of time or the rate of elapsing of local time is not uniform for the same place. In order to have a uniform rate of time lapse' and also to avoid complex mathematical computations, a more convenient term has been adopted for Astrological purposes which is known as 'Local Mean Time' (or a particular place. The local time or more accurately the local meantime (LMT) which is created by the gradual rising of the Sun and the roundness and rotation of the earth is the real or natural time of a place. This differs from place to place and is dependent on the longitude and latitude of the place. In Astrology we reduce every given time into Local Mean Time first and then proceed further.

5.3 Standard time

As explained above, the local time differs from place to place. This becomes quite inconvenient when we have to refer. to time at a broader perspective say National or International level. With the advent of the postal department and later the railways etc., this difficulty increased in india as well as elsewhere. A new version of time was therefore decided upon and was called the 'Standard Time' to have the uniformity of time which was the L.M.T. of a centrally located longitude in that country. In case of India, it was in the year 1906 AD when it was decided that the terrestrial longitude 82°30'E will be taken as the Standard Meridian of India for this purpose and the Local Mean Time (L.M.T.) at this Meridian (82°30' East longitude) will be the 'Indian Standard Time'. By this arrangement, the watches began to show a uniform time through out the country.

5.4 In the case of bigger countries like U.S.A., the entire country was divided into 4 or 5 convenient zones and for each zone a standard meridian representing that zone was chosen as standard meridian for that zone. The L.M. T. at that particular meridian was considered to be the Zonal Standard Time (ZST)

applicable for that zone only. Students are advised to see the last page of their Tables of Ascendants by N.C. Lahiri, where in the 5 different time zones have been indicated for the U. S.A.

5.5 Greenwich Mean Time

As in the case of a country, the necessity to have a uniform time, generated the concept of 'Standard Time' for a country, in the international affairs, it was considered necessary to have a standard time which could be referred to by all the countries of the world whenever needed. Students will recall that the meridian passing through the Greenwich (near London) has been choosen as the 0° longitude or the reference point for reckoning the terrestrial longitudes of all places on earth. Therefore the local time at the meridian of Greenwich at any epoch (moment) is known as Greenwich Meantime (G.M.T.).

5.6 Conversion of Time

Students will recall that while discussing the local time vide Para 5.2 above, we worked out that a difference of 1 ° in the geographical longitudes of two adjacent places on earth will make a difference of 4 minutes in their local time. Therefore by using this principle, we can convert any given time in one form to the other two forms viz if the time given is in 1ST, we can convert it to the LMT or GMT as desired or required, if the geographical (terrestrial) longitude of the place is known. Similarly, we can always convert any meridian of longitude from degrees to time and find out the time zone for any country if the longitude of the standard meridian for that country is known.

5.7 Time Zone

Time Zone is nothing but the standard meridian for any country (or any zone within a big country) expressed in terms of hours and minutes difference with reference to the G.M.T. In other words the difference between standard Time of any country or zonal standard time of any zone and the GMT is known as the time zone for that country or zone. The time zone is (+) or (-) according to the longitude of standard meridian for the country or zone being towards the east or west of Greenwich.

Example 1 : The geographical longitude of the standard meridian for India for IST =.82°30' East
Multiplying this by 4 we get (as 1° is equal to 4 minutes, 1' will be equal to 4 sec.)
= 82° x 4 min : 30' x 4 sec
=328 min : 120 secs
= 330 min. =5 hrs 30 minutes
Since India is towards east of Greenwich the time zone for India will be = (+) 5h 30m which means that IST will always be ahead of GMT by 5^h30^m So if the GMT is 6:00 AM, the Equivalent IST will be $6^h:00^m + 5^h:30^m = 11\ h\ 30^m$ AM.

5.8 Similarly, if the time zone of a country is known, we can work out the longitude of the Standard Meridian for that country.

Example 2 : Find out the longitude of the Standard Meridian for Mexico if it falls in Time Zone (-) 6 hrs.

(a) Since the Time Zone is (-) hence the longitude of the place will be towards "west" of Greenwich

(b) Time Zone = 6 hours or 6 x 60
6 x 60 = 360 mins (As 4 mins = 1 °)
So 360 mm= 360/4 = 90°

Therefore, longitude of Standard Meridian for Mexico = 90°W

5.8 L.M.T. Correction

This is duration of time or a measure of time to be applied to find L.M.T. of a place from the standard time of that country or zone shown by the watch. This is obtained by multiplying the difference of longitude of the place from the Standard Meridian by 4 minutes per degree. The L.M.T correction is either (+) or (-) depending on whether the place is towards East (E) or West (W) from the standard meridian for that country. In order to find out the L.M.T. correction, one should proceed as follows :

Step 1: Find out the longitude of Standard Meridian for the country or zone as the case may be. If it is not readily available, note down the time zone from the list of cities given by N.C.Lahiri in his hook Tables of Ascendants or Indian Ephemeris and work out the longitude as explained in Examples 2 above.

Step 2: Note down the longitude of the place. for which the L.M. T. or L.M. T. correction is desired.
Step 3: Also note whether the longitude of the place is towards east or west of the Standard Meridian.
Step 4: Find out the difference in degrees (or the angular difference between the two long).
Step 5: Multiply the difference (in step 4 above) by 4'. The product will give you the L.M.T. correction. (Apply correction at the rate of 4' per degree to find out LMT).
Step 6: Prefix the sign (+) or (-) to the L.M. T. correction depending whether the place is towards 'E' or 'W' of the Standard meridian.
Step 7 : Apply the L.M.T. correction to the ST (Standard Time) given to get the L.M.T.

5.9 If the L.M.T. is given and it is desired to find the Standard Time, then reverse the sign (+ or -) prefixed to the L.M.T. correction worked out in step 5 and 6 above and then apply the correction. The Examples given below will clarify the above steps.
Example 3 : If the time of birth of a native born at Delhi is 11:30 AM (IST) find out the Local Mean Time of birth of native.
Solution:
Step 1: Long. of standard meridian of India
For IST = 82°30' E
Step 2: Long. of place of Birth
i. e. Delhi = 77° 13' E
Step 3: By persual of the two long. it is clear that Delhi is towards west of the standard meridian of India.
Step 4: Difference in the two long. = 82°30'-77°13' = 5°17'
Step 5: Multiplying by 4 we get = (5x4)+ ($17^{x}4$) = 20^{min} 68^{sec}

Step 6: Keeping in view step 3, the sign to be prefixed *will* be (-).
Hence L.M.T. corr = (-) 21^{m} 8^{sec}

Step 7: Applying the L.M.T. correction we get the L.M.T. of birth
11 hrs 30 mins (-) 21 mins 8 secs. = 11^{h} 8^{m} 52^{s}

Example 4 : Find out the L.M. T. correction in example 2 given earlier.

Example 2:
Long. of standard meridian = 90^{0}W
Long. of Mexico (from the tables)= 99°01'W

Hence Mexico is further west of standard meridian
Difference in the two long. = 99°01'-90° = 9° 1'
Multiplying by 4 we get = 36^{m} 4^{sec}
Hence L.M.T. correction = (-) 36^{m} 4^{sec}

5.10 However we have given the above examples so that the students can practice and understand the principle thoroughly. At times the students may come across a city or place which does not find a place in the aforesaid lists given by N. C.Lahiri. In such cases though the geographical longitude and latitude can be known from any standard Atlas, unless the students are well conversant with the underlying principles, they may find it difficult to work out the L.M.T. corrections.

Example 5 : If a child is born at 11:30 AM (LMT) at New Delhi, what will be the:
(a) ZST of Birth
(b) GMT of Birth
(c) IST of Birth
Solution (a) ZST of Birth
Step 1: Time Zone of New Delhi = (+) 5 hrs 30 min.
or = 5 x 60+30 = 330^{min}
Divide by 4 we get = $82^{0}30'$
Since it is(+), so the Standard Meridian has to be towards 'E' of Greenwich. Therefore Long. of Standard Meridian = $82^{0}30'$ E
Step 2: Long. of New Delhi (from the tables) = 77°13' E

Step 3: Hence New Delhi is towards west of its Standard Meridian. So the LMT correction will be (-).

Step 4: Difference in the two long. = $82^{0}30'$ - 77°13' = 5° 17'

Step 5: Multiply by 4, we get = 20^{min} 68^{sec}
or = 21^{min} 08^{sec}
Step 6: Hence L.M.T. correction = (-) 21^{m} 08^{sec}

Now since LMT of Birth is given and we have to find the ZST of Birth, so in accordance with Para 5.9 above, we have to reverse the sign and then apply the correction. Hence,

ZST of Birth = 11:30 (AM)(+) 21^{min} 08^{sec}
or Time of Birth = 11^{hrs}: 51^{m}: 08^{S} (AM) ZST

(b) GMT of Birth : As the time zone for Los Angels is (+) 5 hrs 30 min , hence the ZST will be more (advance) by 5 hrs 30 min from GMT .

= 11hrs:51m:08sec (-) 5 hrs 30 min ^{s}
= 06^{hrs}:21^{m}: 08^{sec}
or 6hrs:21m:08sec (AM)

(c) IST of Birth: As the Time Zone of India is (+) 5 Hours 30 Min. the IST will be ahead (more) of GMT by 5 Hrs. 30 Min. the IST of Birth will ahead (more) of GMT by 5 Hrs. 30 Min.
So IST of Birth = GMT by (+) 5^{h} 30^{m}
= 6h:21m:08sec (+) 5^{h}:30^{m}
= 11 h:51^{m}:08^{sec} (AM)

CHAPTER 6

SIDEREAL TIME

6.1 We have seen in the previous lesson the three different systems of measuring time viz Local Time or Local Mean Time (LMT), Standard Time for any country or Zone *(i.e.* 1St, ZST etc.,) and the Greenwich Mean Time (GMT). There is yet another system/measure of time which is called 'Sidereal Time'. **The Sidereal Time system is derived from the earth's rotation with respect to the stars.** The students will recall that while discussing the Time Measures vide Lesson 4, we defined the **Sidereal day as the time taken by the earth to rotate once on its axis with reference to any fixed star.** The duration of this sidereal day is equal to 23 hrs 56 min (approximately) or 23 hrs 56 min 4.091 sec. more precisely, of mean solar day. **In astronomical terminology,** the sidereal time at any instant is defined to be the **west hour angle of the Vernal Equinoctial (VE) point** or the **first point of Sayana Aries (Mesha) from the upper meridian** of the place. However for the purpose of its application to mathematical astrology, it will suffice to define the Sidereal Time as the Local Time reckoned according to the apparent rotation of the celestial sphere. **In** other words, whenever the time is reckoned with reference to the sidereal day, it is called Sidereal Time. The Sidereal Time is 'Zero' hour when the first ponit of Aries or Mesha (in sayana system) *i.e.* vernal or the spring equinox crosses the observer's meridian (which is the great circle on the celestial sphere, passing through the zenith and both the celestial poles).

6.2 Necessity to have the Sidereal Time System

Students may be aware that for any astrological delineation, the horoscope prepared for a particular epoch (moment) is not only a necessity but the only astrological equipment available to the astrologer based on which he analyses the shape of things to come in the future. The horoscope which is a map of heavens at the given moment, contains 12 houses and the commencement of the horoscope is the 'first house' or the 'lagna' or the 'ascendant'. It is therefore most important to calculate the correct lagna or the ascendant without which no horoscope can be prepared. Students may now recall that while discussing about the ascendant or lagna vide Para 3.9 of Lesson 3 it was stated that due to the rotatory motion of the earth from west to east on its axis, the whole of sky (or the zodiac with which an astrologer is concerned) appears to come up (or rising) from below the horizon gradually and the sign or rashi (and more particularly the exact degree of the zodiac or that sign) rising in the eastern horizon, is known as the 'lagna' or 'ascendant'. As the lagna or ascendant or the sign of zodiac rising on the eastern horizon of a place at any time, is dependent on the rotation of earth on its axis due to which the time system known as the 'Sidereal Time' is also created, so it becomes evident that the rising sign or the lagna, in turn, is dependent on the sidereal time of the place at the given moment or epoch. It therefore transpires that in order to know the lagna or the rising sign for a particular moment or epoch (be it a birth of a child or birth of a question, incident or accident etc.) it is necessary to first calculate the sidereal time of the moment at that place where the birth of a child or a question or incident has taken place. Students may please refer to the Tables of Ascendants by N.C. lahiri and see themselves that the Ascendants for the different latitudes are given with reference to the sidereal time only. We therefore now proceed to discuss the method to calculate the sidereal time of a given moment or epoch.

6.3 How to calculate the Sidereal Time of a given moment or Epoch

Students are advised to refer to the Tables of Ascendants by N.C. Lahiri (all references in this lesson pertain to the seventh edition of the book published in 1985) and proceed as follows:

Step 1: Note down the sidereal time at 12h noon local mean time for 82°30'E longitude for 1900 AD for the day and month of the given moment from Table I at page 2.

Step 2: Note the correction for the given year from Table II given on pages 3 and 4 o~ the book and apply to sidereal time in step 1.

Step 3 Note the correction for the different localities from Table III given on page 5. A detailed list of principal cities of India has been given on pages 100 to 107. The last column of the table indicates the correction to the 'Indian Sidereal Time'. Similarly the table for the foreign cities has been given on page 109 to 111 of the book and the last column of the table again indicates the correction to the Indian Sidereal Time.

Step 4: The correction for the year (step 2) and the correction for the place (step 3) should be applied to the sidereal time noted in step 1 according to the sign (+) or (-) prefixed to the correction as shown in the respective table. Having applied these corrections, the result obtained (let us call it' A') will represent the Sidereal time for the given date, year and place but will be for the local noon *i.e.* 12 hrs, as we have not yet applied the correction for the hour and minutes before or after the local noon, as the case may be, for the give moment.

Step 5 Convert the given time of epoch into LMT by applying the LMT correction. This has been discussed elaborately in great detail and explained with the help of examples also vide para 5.8 of the preceding chapter. However the quantum and the sign (+, -) of the correction to be applied to the 1ST or ZST, as the case may be, has also been indicated in the tables at pages 100 to 107 for principal cities of India under column LMT from 1ST and, at pages 109 to 111 for foreign cities under column LMT from ZST.

Step 6: As the Sidereal time noted in the step 1 pertains to the local noon, we have to find out as to how many hours before or after the local noon, is the given time of the moment or Epoch. In other words we have to find out the "Time Interval" between the Local Mean Noon (LMN) and the LMT of the given moment. So, in case the LMT of the given moment is before noon, subtract it from 12:00 hours. In case the LMT of the given moment is in the afternoon, the LMT itself becomes the Time Interval (T.I.) also because after 12 noon our watches show 1:00 PM and not 13 :00 which means that 12 hours have already been deducted.

Step 7: The Time Interval (T.I.) worked out in step 6 above is to be increased by applying the correction given in table IV which gives the correction for hours and minutes of the T.I. By applying this correction we get the Increased T.I. Let us call it (B).

Step 8: The 'Increased T.I.' (B) is added to the corrected Sidereal Time (A) in step 4 above in the case of PM (afternoon) births or epoch and, subtracted from the (A) in the case of AM (before noon) births or epoch, as the case may be. The result thus obtained is the Sidereal Time of the birth or epoch or the given moment. The above mentioned eight steps can be explained with the help of a practical example or illustration.

Example 1 : Find out the Sidereal Time of birth of a native born at Delhi on Saturday the 01st Nov. 2008 at 09:30 AM (IST)
Solution: Use Tables of Ascendants by N.C. Lahiri

Step 1 : Sidereal Time at 12h noon on 01st November 1900 (page 3)	= $14^h : 40^m : 21'$
Step 2 : Correction for the year 2008 (from page 4)	= (+) $03^m : 20'$
Step 3 : Correction for Place (Delhi) (page 5 as well as page 102)	= (+) $0^m : 03'$
Step 4 : Sid. Time on 25th Oct. 2010 at Delhi, at noon (A)	= $14^h : 14^m : 14'$

Step 5 : IST of birth (given) = 09 : 30 : 00
LMT correction (page 102) = (-) 21 : 08
Therefore LMT of Birth = 09 : 08 :52

Step 6: TI from noon (subtract the
LMT from 12h being AM birth)
(12 hrs - 9 hrs 8 min 52 sec) = 02 : 51 : 08
Step 7 : Correction to increase the TI from
table IV (page 5)
for 2 hrs = 00 : 20
for 51 min 8 sec = 00 : 09

Therefore Increased TI (B) = 02 : 51 : 37

Step 8 : Being AM Birth (A)-(B) = $14^h : 14^m : 14'$
$(-)\ 02^h : 51^m : 37'$

Sidereal Time of Birth = $11^h : 22^m : 37'$

6.4 Caution
We hope that by now the students would have understood the methodology to work out the Sidereal Time very clearly. However before we end this topic, we will like to caution our students to note carefully the few points mentioned below :

6.4.1 Unlike the civil time (LMT or GMT or 1ST or 2ST) the Sidereal Time is never expressed in terms of AM or PM. It is always starting at 'O' hour and goes upto 24 hour after which it again starts as 0^{hour} .

6.4.2 WAR TIME: From **1st Sept. 1942 to 14th Oct. 1945, the Indian Standard Time (1ST) was advanced by one hour all over India** including modern BangIa Desh and Pakistan for purposes of daylight saving during the war period and was thus ahead of GMT by 6 H 30 min. Therefore any recorded time during this period (Both days inclusive) must be reduced by 1 hour to get the corrected IST before LMT correction is applied to obtain the LMT of birth. (Provided the same correction is not made while noting down the time on the record.)

6.4.3 SUMMER TIME **:** Students are advised to refer to page 112 of their *Tables of Ascendants* and read carefully each and every word thereof in order to acquaint themselves with the summer timings being observed in Britain, USA, Canada, Mexico, USSR and other European countries mentioned therein. The recorded time falling on the dates/ period of summer timings indicated in page 112, must therefore be corrected first as applicable, *before* it is converted to local Mean time of epoch.

CHAPTER 7

SUNRISE AND SUNSET

7.1 In the previous lesson we have seen the methodology for working out the Sidereal Time of birth or of an epoch. With this Sidereal Time we enter the relevant Table of Ascendants for the latitude of the place of birth to find out the Ascendant. However, before we proceed on to find the ascendant or lagna or the rising sign, we deal with the subject of sunrise and sunset in this lesson. The time of sunrise, sunset etc is very useful in astrological calculation to find out the dinmaan, ratrimaan (i. e. the duration of· day and night), Ishtakala or Ishtaghati which forms the basis to calculate the lagna rising by the traditional method,. Kaal haras, Kaal velaas, Hara lagna, Mandi, Rahu kaalam etc., which have great significance in the Hindu Astrology.

7.2 Sunrise

The exact moment at which the sun first appears at the eastern horizon of a place is time of sunrise. As the Sun has a definite diameter, the solar disc takes some time *i. e.* about 5 to 6 minutes to rise. Therefore, from the first visibility cif the upper limb of the solar disc to the time when the bottom limb of the solar disc is just above the horizon of the place, there will be a time diference of about 5 to 6 minutes. It has, therefore, been acknowledged that for astrological purpose we may take the moment at which the centre or the middle of the solar disc is at the eastern horizon of the place as the sunrise time for that place.

7.3 Sunset

Similarly the sunset for a particular place is the exact moment at which the centre or the middle of the solar disc is at the western horizon of the place.

7.4 Apparent Noon

This is marked when the centre of the sun or the middle of the Solar Disc is exactly on the meridian of the place. The apparent noon is almost the same for all places.

7.5 Ahas and Ratri

Ahas is the duration of day i. e. the duration of time from sunrise to sunset. Ratri is the duration of time from sunset to sunrise. On the equator, the Ahas and Ratri are always 30 ghatis or 12 hours each, while on other latitudes the sum of Ahas and Ratri will be 24 hours or 60 ghatis.

7.6 Calculation of time of Sunrise and Sunset

In this lesson we propose to calculate the time of Sunrise and Sunset by the method of 'interpolation' from the given data in the Ephemeris. However there is a proper method to calculate the time of sunrise and sunset without making any reference to the given data in the Ephemeris. We don't propose to discuss that method through this lesson' as the same is not only cumbersome but involves too much mathematical calculation needing enormous time which is not warranted being beyond the scope and purview of these lessons.

7.7 Calculation of time of Sunrise and Sunset by Method of Interpolation

Step l: As the time of sunrise or sunset differs from latitude to latitude we must first of all note the latitude for the place where the time of sunrise etc., is desired.

Step 2: Refer to page 93 and 94 of Lahiri's Indian Ephemeris for the year 2002 and select two such consecutive dates that the date for which the sunrise time is desired falls in between the two selected dates. Similarly select two such consecutive latitudes from the table at page 78 so that the latitude of our desired place falls in between the two latitudes so selected.

Step 3 : Note down the timings of sunrise or the sunset as the case may be, for the above selected dates and latitudes as given in the table.

Step 4 : Find the time of sunrise and/or sunset by interpolation (simple ratio and proportion method). The time so obtained will be the Local mean Time (LMT)· of the time of visibility of the upper limb of the solar Disc. Add 3 minutes to the time of sunrise and deduct 3 minutes from the time of sunset to get the LMT of coincidence of the centre of the solar disc with the horizon.

Step 5 : In case the time is required in terms of IST or ZST, apply LMT correction as applicable by reversing the (+) or (-) sign prefixed to the LMT correction as given in the list of table of Ascendants from Page 100 to 111.

7.8 The above method has also been indicated at page 99 of Lahiri's Indian Ephemeris for the year 2008 and students are advised to follow the same with advantage. However we also give below the illustration to explain the steps mentioned above more clearly to our students.

Example 1 : Desired IST of Sunrise and Sunset at Delhi on Oct 05.
Solution: Use page 99 of Lahiri's *Indian Ephemeris* for 2008 .
Step 1 : Latitude of Delhi (Page 150 of Ephemeris for 2008) = 28°39'N or 28.65°N
Step 2 : Dates selected are Oct 03 and Oct 07, Latitudes selected are 20^0N and 35°N
Step 3 : The data given for the above mentioned dates and latitudes at page 94 of the Ephemeris is as follows:

	Sunrise (LMT)		Sunset (LMT)	
Date	Latitudes		Latitude	
	20^0N	35°N	20^0N	35°N
Oct 03	5:58	6: 13	5:31	5: 16
Oct 31	6:01	6:20	5:26	5:07

Step 4 : We can now obtain the values for the Oct 27 by simple interpolation which are as follows :
5:11 (-)17^m
″.c ()17 17
vanatlOn lor 8.65° = + $15^{X8.65}$ (-)15 x8.65
(Delhi's Lat (-) 20°); (28.65°-20°=8.65°)

9:80 min	solar disc = (+) 0:03
or say = (+) 10 min	6.12 AM
Therefore LMT of	= 9:80 min. = (-) 10 min
upperlirnb visibility= 6: 09 AM	(-)0:03 5.15 PM
LMT for centre of	

Step 5 : Students may now compare this with the Time of sunrise and sunset (upper Limb) for Delhi given on page 91 of Ephemeris which is as follows for 27 Oct.

6:30 AM 1ST of Sunrise (Upper limb)	6:09 AM LMT of Sunrise . (Upper limb)
Deducting 21^m 0:21	5:40 PM 1ST of Sunset (Upper limb)
	0:21
	5:19 PM LMT of Sunset (Upper limb)

Step 6 : Solar Disc

correction (+) 0 : 03 (-) 0 : 03

LMT for Center 6 : 12 AM 5 : 16 PM

of Solar Disc

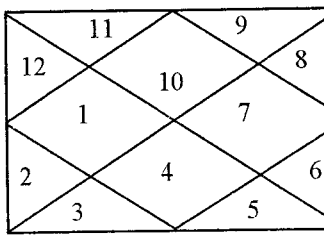
which agrees with that worked out in Step 4.

CHAPTER 8 **CASTING OF HOROSCOPE I MODERN AND TRADITIONAL METHOD**

8.1 The horoscope is a map of heavens for a given moment at a particular place. It indicates the sign of Zodiac rising on the eastern horizon of the place at the given moment which is known as the lagna or the Ascendant. It is also known as the first house and the successive Rashis/ signs becomes the successive houses or Bhavas (as called in Hindu Astrology). Apart from the lagna or the Ascendant this map also indicates position of various Rashis and Planets at the given moment/epoch.

8.2 Forms of Horoscope

There are many types/forms presently in vogue in different parts of India as well as in the European countries. For the reference of students we give here some of the most commonly used formats by Astrologers in India and abroad. Students are advised to make themselves familiar with these 'Formats', though they may follow anyone of these appealing to be the most convenient :



Pisces Aries Taurus Gemini

MeenaMesha Vrisha Milbuna

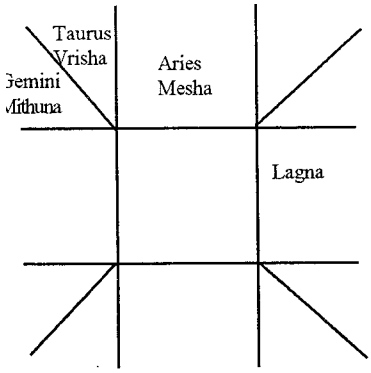
8.2.1 *TYPE 1* : This is the format which is commonly used in NorthINorth-west part of India. The top middle portion is always treated as the lagna or Asc or the I House and the number of the Rashi/sign rising at the moment of birth on the eastern horizon of the place is indicated here e.g. 10 for makar or Capricorn. Then the counting of houses is done anti-clockwise. So the II house will have the sign! Rashi next to Capricon (Makar) *i.e.* Kumbha or Aquarius written there as NO.1I. The number of the successive Rashil sign is then written consecutively one after the other in the succeeding houses, anticlockwise. Then the position of the planets at the moment is worked out and posted in the horoscope in the respective rashi/sign occupied by them in the Zodiac.

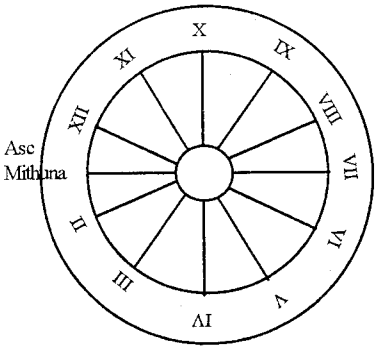
8.2.2 *TYPE II* : This type of format of Horoscope is commonly used in the Southern part of India. In this type the counting of houses is in clockwise direction. Here the position of Rashis/sign are fixed for all the horoscopes, e.g. the top left hand square in the chart represent the sign Pisces (Meena) and succeeding Squares in clockwise direction will represent Aries (Mesha), Taurus (Vrisha), Gemini (Mithuna), and so on. As this sequence of sign/Rashis is fixed for all the horoscopes, these are never written in chart. The sign/Rashis rising on the eastern horizon of the place or the lagna or Asc is marked in the appropriate sign in the chart as shown and word lagna or Asc is written in that sign. Afterwards the planets according to their position in the Zodiac at the moment are posted in the respective sign in the chart to make the map or the horoscope complete.

8.2.3 *TYPE III* : This type of chart is commonly used in Bengal and Neighbouring area. In a way it combines the two charts discussed earlier i. e. Type I and Type II in as much as the counting of houses is done anticlockwise (like Type I) but the position of Rashis/signs is fixed for all the

horoscope (as in the case of Type II). The other aspects like posting the position of planets etc., are similar to other charts. The lagna is written in the appropriate sign in the chart.

Type **III** Type IV





8.2.4 *TYPE IV:* This chart is commonly used by Western Astrologers. Nowadays some Astrologers in India particularly in Maharashtra have also started using this type of chart for the horoscopes. This is a circular chart as shown in the figure, the twelve Bhavas or houses are marked in chart and symbol along with the degree is also indicated on each bhava. In Indian (Hindu) Astrology, the cusps are treated as bhava Madhaya or the middle point of the houses where as in Western Astrology, the Asc cusp means the beginning of the first house, the II cusp means end of 1st house and beginning of the II house and so on. The planets are also shown with their symbols only and the degrees of the zodiac acquired by a planet is also written along with the Planet in the chart.

8.3 Casting of Horoscope

The process of casting of horoscope involves two main activities. Firstly we have to find by calculation the exact degree of longitude of the Ascendant or the lagna. Secondly

we have to calculate the longitudes of all the nine planets or grahas mentioned earlier in chapter 1.

8.3.1 There are mainly two important methods to find out the lagna and the planetary position at the time of birth of a child or a question, event, or incident/accident. The first method is called the *modern method* by using the table of Ascendants and ephemeris. The other method is *traditional method* adopted by the Hindu astrologers where the horoscopes are prepared with the help of traditional Panchangas (almanacs, a kind of traditional ephemeris). Now a days with the advent of calculators, log tables, computers etc. comparatively more accurtae horoscopes can be prepared by using modern method. In these lessons, therefore, our emphasis will be more on to the modern method. However for the academic interest of the students we will discuss the traditional method also at the appropriate time and place. But for the present let us proceed with the modern method of casting horoscope.

8.4 Modern Method of Casting Horoscope

As already metnioned in para 8.3 above it involves or
consists of two stages, viz:

(a) calculation of longitude of lagna/Asc *(b)* calculation of longitudes of planets

We will therefore take up the above two stages one by one.

8.4.1 *CALCULATION OF LONGITUDE OF LAGNA:*

We have already discussed in earlier lessons that the long. of lagna or the Ascendant is calculated by using the Tables of Ascendants which gives the Ascendants rising at different latitudes for each 4 minutes interval of Sidereal time. Accordingly the Sidereal time of Birth/epoch is very important to know the lagna/ Ascendant. In lesson 7 we have discussed at length how to find out the sidereal time of birth/epoch and we hope that by now our students are well

conversant with the calculation of sidereal time of the epoch. We will now advise our students to proceed as follows to calculate the longitude of the lagna or the Ascendant:

Step 1: Calculate the Sidereal time of birth/epoch by following the 8 steps given in chapter 7.

Step 2: In the book Table (i.e. Ascendants by N.C.Lahiri, locate the page where Ascendants for the appropriate latitude i. e. the latitude of the place of the Birth are given. In case table for exact latitude is not available, then the other table for the latitude which is nearest to the latitude of the place of birth could be made use of. In case a more precise work is needed, the students may find out/calculate the Ascendant at two consecutive latitudes falling either side of the given latitude & then find out the exact longitude by interpolation of the two Ascendants. However we feel that in most of cases the calculation of Ascendant for the nearest latitude may serve the purposes and the interpolation may not be necessary.

Step 3: Calculate the Ascendant/lagna with the help of the appropriate Table.

Step 4: As the table of Ascendants by N. C. Lahiri gives the Nirayana longitudes of Ascendants for the year 1938, it is necessary to apply the Ayanamsha correction as given at Page 6 of the book to get the correct lagna. The above steps can be best explained with the help of an example.

Example 1 : Calculate the long of Ascendant/lagna for the Native of Example 1 in Para 6.3.

Solution: Referring to the example 1 of chapter 6 we get:

Step 1: Sidereal Time of Birth = 11 hrs 22mts 22secs.

<\sc for Delhi have been given at page 48. So vVe use the table given at page 48. (Also available it page 134-35 of Indian Ephemeris for 2002).

fhe Ascendant/lagna is calculated as follows : :Refer Page 134 of Ephemeris for 2002)

Sidereal Time	Long. of Ascendant
11 h 22^{m} 00sec	7^{5} 16° 30'
0 0 22^{see}	0 0 04'

F or additional 22 sec of Sidereal Time increase will be = 12 -;- 60 x 22 = 4'

... for 11hrs 22mts 22secs= 7^{s} 16° 34'.

Ayanamsha correction for the year 2002 (Refer Page 135 of Ephemeris for 2002) = (-) 0° 54'

Therefore correct lagna/ Asc = 7^{s}-15° -40'

or Scorpio 15°-40'

(As 7 signs *i.e.* upto Libra already passed)

IIe 2 : Calculate the Asc of lagna for the native NO.2 in para 6.3.

Sid. Time of Birth = 11-49-15

The latitude of New York is 40° 43'N

(This can be noted from the table given at page 111). An appropriate table giving the longitude (nearest latitude 41 °_0' North) is given at page 62. So we use this table to calculate the Asc.

Calculate the lagna or Asc as follows :

Sidereal Time	Ascendant/lagna
11 h 48^{m} osee	7^{s} 15° 28'
11^{h} 52^{m} osee	7^{s} 16° 17'

variation in 4 minute = 49'

49
Imts 15secs (or 75 sees) = - x75 240
=15' (Appx.)
= 7^5 15° 28' + 15'
Step 4: Ayanamsha correction
for the year 2002 = -54'
Therefore correct Lagna = 7^5 14° 49' or Ascendant is Scorpio 14° 49'
Question : Students may please choose the places situated in northern Hemisphere out of the 10 places given in Question of Exercise 6 and work out the longitude of lagna/ Asc in all those cases.
CHAPTER 9
CASTING OF HOROSCOPE II
9.1 Calculation of Ascendant for places situated in Southern Hemisphere (or the Southern Latitudes)
The methodology for calculation of lagna/ Ascendant for places located in Southern hemisphere/southern latitude is exactly similar as for Northern latitude, if we have with us Tables of Ascendants for Southern Latitudes. The Lahiri's tables available to us are for Northern latitude. If the same tables are to be used for calculating the Lagna rising in places situated in the Southern latitudes, it is but obvious that some modification is definitely called for. As such for calculating the Lagna in Southern Latitude with the help of Tables for Northern Latitude, we have to proceed as follows:
Step 1: Find out the Sidereal Time of Birth by following the eight steps, 1 to 8 given in chapter : 6 as done in the case of Northern Latitude.
Step 2: Add 12 hours to the Sidereal time worked out in step 1. If the total Sidereal Time after adding 12 Hours exceeds 24 hrs., then subtract 24 Hours from it, and retain the remainder. The Sidereal Time so modified will be called as modified Sidereal Time.

Step 3 Locate the appropriate table for the Latitude of the place of birth in the Tables of Ascendants for Northern Latitudes.
Step 4: By using the Modified Sidereal Time worked out in step 2 above, calculate the Ascendant in the similar way as in chapter 8 using the Table located in step 3.
Step 5: Apply Ayanamsha correction (Page-6) for the appropriate year, i.e. the year of birth.
::,tep 6: Add 6 Signs to the Ascendant Calculated/worked out in step 5 to get the correct Lagna. If the Asc. exceeds 12 signs then subtract 12 signs from it.
9.2 Students may please note that modification incoported above is applied only for the places in Southern Latitudes if the *Tables of Ascendants* used is for Northern Latitudes and vice-versa. If the *Tables of Ascendants* are available for the same hemisphere in which the birth has taken place, no modification is necessary. Students are also ~dvised to read the Example 3 given in the Tables of Ascendants for Northern Latitudes by N.C. Lahiri, at page - *(viii)* in the beginning of the book. We will now explain the abOve mentioned 6 steps with the help of an example.
Example 1 : Calculate the lagna for the native of example no. 3 in chapter 6. (DaB 17-8-2002 TaB 15-25 hrs. 2ST)
Solution: Place Sydney, Latitude: 33° 52' South Step 1 : Sid. Time of Birth = 13^{h} 11^{m} 32^{5ec}
Step 2 : By adding 12h we get the modified Sidereal Time as 25^{h} 11 m 32^{5ec}. As it exceeds 24^{h}, deduct 24 hrs. Therefore, Modified Sidereal Time = 1^{h} 11^{m} 32^{5ec}.

Step 3 : Latitude of Place of Birth is 33°52'S. Hence use the Table for 34°0'N (Page-55)
Step 4 : The Lagna is calculated as under :

	Sidereal Time	Lagna @
	$I^h\ 8^m\ 0^5$	$3^5\ 6°\ 18'$
	$I^h\ 12^m\ 0^5$	$3^5\ 7°\ 8'$

@ To be corrected
Variation in 4 Mins. = 50'
(or in 240 Secs)
Therefore, variation in 212 Sec. = 50+240x 212 = 44.17'
or Say = 44'
Hence Lagna for I^h llm 32^{5ec} = $3^5 6°18' + 44'$
= $3^5 7°02'$
Step.5 Apply Ayanamsha Correction for 2002 = (--)0°54' . Corrected Lagna in North Latitude $3^5 7°02'(-)54' = 3^5 6°08'$
Step 6 : Add 6 signs to get the lagna in Southern Latitude = $+6^5$
= $9^5 6°8'$
Therefore, Lagna or Asc Capricon 6°8'
Example 2 : Calculate the lagna for the native born on 14th November 2001 at 4hrs 48mts (ZST) in Lima (Peru).
Solution: Refer N.C. Lahiri's Table of Ascendant at page llO and note birth place *i.e.* Lima (Peru) and latitudes, longitudes, time corrections etc.
Time Zone (-) 5 hours. Latitude Longitude 77°-02' west L.M.T. -08 sec.
12°-02' south fromZST(-)8 min
I.S.T. from Z.S.T. + 1 Oh-3 ㎜, correction to Indian Sidereal Time (+) Imt. 45 secs.

Step 5: ZST of the birth of native
Step 6: LMf Local Tmie Correction (page-110) Step 7: L.M.T. of birth
Step 8: As it is fore noon birth
1.1. from noon (12 hours(-) $4^{h}39^{m}52^{sec}$) = 7: 20 : 08
Correction to increase the 1.1. (Page 5)=(+) 01 : 12
Hence the increase 1.1. (B) 7 : 21 :20
Being A.M. birth (A)-(B) 8 : 14 : 10
(15 : 35 : 30 (-) 7 : 21 : 20) = 8: 14 : 10
Step 12: The Sidereal time of birth 8 : 14 : 10
Step 13: The Latitude indicates the birth place is in southern
Hemisphere. But the Lahiri's Table of Acendant is for Northern latitudes. Therefore the method prescribed in para 9.1 is to be used *i.e.* add 12 hours to the sidereal time available at step 12.
Step 14: Modified Sidereal Time 12hrs + 8^{hrs} 14^{mts} l0see
Step 3 :
Step 4 :
Step 9 :
Step 10:
Step 11:
Sidereal Time of 14 Noy. 1900
12 noon at Longitude 82°30'East (Page 3) =
Correction for the)'ear 2001
(page 4)
Correction to 1. Sid. Time (P-ll 0) Sid. Time of 14th Nov. 2001 of Peru
at 12 noon (A)
=(+) 0 : 2 : 08 =(+) 0 : 01 : 45
=(-) 0 : 8 : 08 := **4: 39 :.52**
Step 15: Calculate Ascendant on the basis of Latitude 12°_02' North (P-19 of Table of Ascendant), the table is for 12° North, which is nearest. The use is as under:

Hence Ascendant is 0115°-30' + 36' or Mesha
Aynamsha correction (P-6)
Correct Ascendant

Sidereal Time				Ascendant	
Hrs	Mts	Secs	Rasi	degree	mts
20	16	00	0	16	36
20	12	00	0	15	30
0	04	00	0	1	06'

Modified S.T. of birth = 20: 14: 10, which is more by 0 : 2 10 (20 : 14 : 10 (-) 20 : 12 : 00) or 130 secs Variation is 4 mins or 240 secs = 66'
'U .,. d 66 . 858 3 5 varIatIOn m 130 secon s = 240x 130 = 24 =.5.7
or =36' or *0/16°-06'* = 16° 06' 0° -,-53'
Step 16: 12° 2' is Southern Latitude, hence
add 6 signs to the above *W* + 0115°-l3') = *6s/15°-13' i.e.* Tula Ascendant of 15° 13'
Step 17: Hence the native born with Tula 15 ° l3' Ascendant.

EXERCISE - 9

Calculate the Ascendants for the data given below :

(a) Jakarta	21-4-1943	5:25 AM (1ST)
(b) Mombasa	11-7-1923	10:30 PM (IST)
(c) Narobi	17-8-1986	6:24 PM (2ST)
(d) Canbera	23-4-1972	4:40 PM (2ST)
(e) Sydney	15-9-1936	3:25 AM (1ST)

CHAPTER 10 CASTING OF HOROSCOPE III MODERN METHOD

10.1 Calculation of Longitudes of *Planets/Planetary Position at Birth* or *Graha Spashta*

We have already advised our students to purchase and have with them a complete set of Lahiri's Indian Ephemeris (Please refer Para 3.13 in Chapter 3). A perusal of these Ephemeris reveals that :

(a) In the yearly Ephemeris e.g. for the year 2001, 2002, 2003, the daily position of all planets including Moon has been given at 5:30 AM (IST).

(b) In the condensed Ephemeris for the year 1941-51, 1951-61, 196L-71, 1971-81, 1981-85, 1986-1990, 1991~1995 & 1996-2000 etc., daily position of Moon has been given for 5:30 AM (IST) where as for the remaining Planets except RahulKetu, the position has been given at 5:30 AM (IST) for every alternate day. Rahu's position has been given for 1 st . of each month for true as well as mean Rahu.

(c) In the Ephemeris (condensed) for the years 1900 to 1941, the position have been given for 5:30 PM (IST) daily for Moon, twice in a week *i. e.* for Sundays and Wednesdays for Mercury and weekly position *i. e.* for every Sunday in respect of Saturn, Jupiter, Mars, Sun, and Venus. Rahu's position has been given monthly *i. e.* for 1 st of each month. The Rahu's position in this Ephemeris is for 'Mean' Rahu

only and not for 'True' Rahu. *n'ue* Rahu is by considering the actual *ova/elliptical* shape of orbit of Moon and the ecliptic, where as *Mean* Rahu is calculated by considering their orbits as perfect circle. As the later is not factually correct we prefer to have only *T7'ue* Rahu in our calculations as far as possible.

10.2 Keeping in view the above three different types of data available in the Ephemeris, we propose to discuss the calculation of planetary positions in three different parts. Accordingly we will first of all take the Ephemeris for the year 2002 and calculate the planetary position for the given time of Birth of a native. It should be noed that the Lahiri's Indian Ephemeris gives the position of Planets either for 5 :30 AM (IST) or 5:30 PM (1ST). *Accordingly any time of Birth whether it is given in LMT or ZST or GMT must be first converted to 1ST* so *as to use these Ephemeris.*

10.3 Calculation of Planetary Position by using Yearly Ephemeris

The calculation of Planetary position is best explained with the help of an example. However before we take up an example it is necessary to advise the students that while selecting the two consecutive dates from the ephemeris for obtaining the reference position of planets, care must be taken to see that the dates should be such so that our date and time of birth falls in between the two for convenience in interpolation.

Example 1 : Calculate the planetary position at the time of birth of a native at Delhi on Sunday the' 25 Oct. 2002 at 09:30 am (IST) [Para 6.3 and para 8.4].

Solution: Use Lahiri's *Indian Ephemeris* for 2002 we will calculate the moon's position first.
MOON (Page 32)
Position at 5:30 AM (IST) on *25110/02* = 1'18°3' 58" Position at 5 :30 AM (IST) on *2611* 0/02 = 2[s] (XPI9' 52"

Motion in 24 hours OSI2°15'54"
Time elapsed from 5:30 AM to 9:30 AM 4 hours

Therefore motion in 4 hours (1/6th of 24 hourly motion)
OS2°2'39"

Add position at 5:30 AM of 25-10-2002 1'18°3'58"
Position at Birth 1'20°6'37"
or Vrish 20°6'37"

or rounding off we can say position of Moon = Vrish20°7'
Note: The position at 5:30 AM is indicated in the 7th column. The first column gives the dates of the month.
10,4 The above method of finding out the proportionate motion in 4 hours is by simple arithmetic or by using an electronic calculator. We can also find out this motion by using the log tables given at page (156-57) of the Ephemeris. liowever, as these log tables are proportionate and are meant for use with 24 hourly motion.
Therefore motion of Moon in 24 hours =12° 15' 54" Log of motion *(i.e.* 12° 15' 54" or 12° 16')

(page 156) =0.2915
Log of 4 hours =0.7781

(T11lle Interval from 5:30 AM to **Birth** T11lle)

Total = 1. 0696

By taking antilog of this we will get the desired motion in 4 hours. Since there is no separate table, we have to locate the nearest figure to 1.0696 in the table and then read the degrees and minutes. We find that antilog of (nearest)

1.0720 is 2° 2'
and 1.0685 is 2° 3'
Therefore variation of 35 is equal to I' or 60"
So variation of 1.0696 (-) 1.0685 is 63~x 11 = 18.857" · ❩
Deducting 19" from 2° 3' we get the motion of Moon in 4 hours Adding this to position at 5:30 AM on 25-10-2002
Position of the Moon at Birth

or say =

10.5 By looking at the above calculation student may feel that using logarithms is rather a cumbersome process. Actually it is not so. In the above calculations we have tried to show to the students that if more precision is required we can work out the longitudes of planets upto seconds (") of arc by log table also. However in most of the cases, calculation of longitudes of planets upto nearest Minute (') of arc will suffice or meet our requirement. Therefore we need not interpolate the figures while working out the Antilog and only the nearest figure will do. In the context of Moon, while taking antilog the nearest figure is 1.0685 for which antilog is 2°03' and this will meet our requirement. More over in the instant example the time interval from 5:30 AM to time of birth *i.e.* 9:30 AM is 4 hours which is a round figure and students can easily make 1/6 (of 24 hours motion) to get the 4 hours motion. However more often than not, the time interval may be like 7 Hrs 21 Min., **11** Hrs 39 Min. and so on. In such cases the use of logarithms will be easier and quicker. Students may threfore decide for themselves as
1'18°3'58" I[s]2006'39" 1 s2001'

P 15° 11' = +6s

to which method *i.e.* the calculator method or the logarithm method appears to be the easier one and may adopt the same. The whole idea is only to get the proportionate motion of planets during the time interval from the given reference position to the time of birth.

10.6 With the above background we can now proceed to find out the longitudes of other planets at the time of birth. It may further be mentioned here that unless the planetary positions are required correct upto seconds (") of arc, we may round off the same to the nearest minute (') of arc by neglecting 30" or less and by adopting next higher minute for 31" and above. In the case of remaining planets, we have 24^h position for each. Our time interval 4^h is also fixed for all the planets. So we can find out/calculate their planetary position simultaneously in one operation in a tabular form. (See next page)

As Ketu is always opposite to RAHU or 6 sign away from RAHU, its longitude is calculated by adding 6 sign to the longitude of Rahu. Accordingly :

Longitude of True Rahu Add 6 sign

Longitude of Ketu $\underline{7^5\ 15°\ 11'}$

(If it exceeds 12s, deduct 12 signs

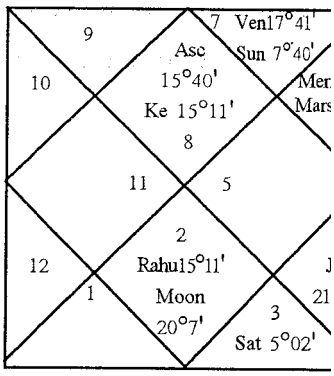
but this is not the case here,

Therefore Longitude of Ketu $\underline{7^5 15°\ 11'}$

Students will recall that we had calculated the longitude of lagna for this native *vide* Example 1 of Chapter 8 (Para 8.4.1) as 7^5 15° 40'. We can now draw the chart as follows:

Calculation of Planetary Position at 09:30 **AM (1ST) 25-10-2002**

Position of Planets at 1ST on (Page	Sun	I\.'1ercurv	-\'cnus (R)	!dars	Junite	Satur (R)	Rahu (D)
26-10-2002	6'8'30'1	Y26°12'	6'17'14'	5'12°4	3~2P	2$5°0'	1$15°1
25-10-2002	6$7°30'2	5'24°33'	6'17°46	5'12°0	3'21°4	2'5°0	1'15°
Motion in 24	59'47"	1°39'	(_)0°32	39'	7'	(-)2	I
Log of in 24 Hrs. (P-	1.3802	I.l627	1.6532	1.5673	2.313	2.857	3.158
Log 61' Time i.e. 4 Hrs.	0.7781	0.7781	0.7781	0.7781	0.778	07781	0.778
Total	2.1583	1.9408	24313	2:3454	3.091	3.635	3.936
Nearest in the Log	2.1584	1.9279	24594	2:3133	3.158	_	_
By Taking of above we get							
Motion in 4	0°10'	0°17'	(-)0°5'	0°7'	0°1'	(-)0°0	(+)0°
Add position 25-10-2002	6$7°30'	5'24°33'	6'17"46	5'12°0	3'21°4	2'5°0	1'15°
Position at on 25-10-	6'7°40'	5'24°50'	6'17°41	5'12°8'	3'21°4	2'5°2'	PI5°



	RahlSO Moon 20°7'	Sat
	25-10-2002	Jup 21 °42'
	09: 30 AM (IST) DELHI	
	YABc Sun 7° 15°40' Yen *~Kej* 17°41'	MaI2 Mer 24°50'

10.7 Students may please note that the pOSItiOn of Planets in the heavens is dependent on the date & time only and is independent of the place of Birth. The place of birth is important for calculating the Rising Sign or Lagna or

Ascendant. Before we close this discussion we will take up another example to work out the longitude/position of planet.

Example 2 : Calculate the longitude of Planets for a native born at 10:24 PM (IST) on 11 July, 2002.

Solution : As the place of birth has not been given we can not calculate the lagna. As such only the longitudes of planets are required to be calculated. This has been worked out in the tabular form in the next page which is self explanatory.

Question 1 : Calculate the Planetary Position
(longitudes of Planets) for following date md time :

(a) 26-1-2003 10:20 AM (1ST)
(b) 25-12-2003 7:30 PM (ZST) London
(c) 15-08-2003 7:30 AM (IST)
(d) 25-04-2003 00:45 AM (ZST) New York

Note : For (b) & (d) students may refer to Para 10.2.

Position at	Sun	Moon	Mere	Venus	Mars	Jup	Sat	Ra (R)
5.30 12-7-2002	2^{s}25'36'22"	3^{s}W2'16"	2^{s}15'02'	4"7'22'	3^{s}5'03'	3^{s}1'30'	1'28'42'	1'23'40'
5.30 AM 11-7-2002	2^{5}24'39'08"	3^{s}1'57'23"	2^{s}13'Ol'	4^{s}6'15'	3^{s}4'25'	3^{s}1"16'	1^{5}28'35'	1'23'44'
Motion in 24 Hl's	57'-14"	14'04'53"	2'-01	1'-07'	0'-38'	0'-14'	0'-07'	H
Log Motion in 24 Ill's	1.4025	0.2315	1.0756	1.3323	1.5786	2.0122	2.3133	2.5563
Log of Time interval* (W'54^{m})	0.1523	0.1523	0.1523	0.1523	0.1523	0.1.523	0.1523	0.1523
Total	1.5548	0.3838	1.2279	1.4846	1.7309	2.1645	2.4656	2.7086
Nearest figure given in table	1.5563	0.3838	1.2289	1.4863	1.7270	2.1584	2.4594	2.6812
Taking anti-log we get the motion till time of birth	0°40'	9°55'	J025'	0°47'	0°27'	0°10'	0°5'	(-)0°3'
Add reference position	2"24'39'08"	3"1'57'23"	2^{s}13'01'	4^{s}6'15'	3^{5}4'25'	3^{s}1'16'	l^{s}28'35'	l^{S}23'44'
Position at birth	2^{s} 25'19'08"	3^{s} 11 °52'23"	2^{s} 14°26'	4^{s} 7°2'	3^{s}4°52'	3^{s} OJ026'	1" 28°40'	l'

*Time Interval for all planets from 5 : 30 A.M. to 10 : 24 P.M. = 16 Hrs 54 Min. (R) Means Retrograde i.e. the planet appears to be moving backwards.

Note: Ketu's position would be six signs away from Rahu and hence not calculated separately.

Positio	Sun	Moon	Mer	Ven	Mars	Jup	Sat	Ra (R)
5.30 15-2-2001	10 2 30	70 51	9 28 1	11 15 3	7 6 13	1 8 02	1 0 36	2 20 5
5.30 AM 14-2-2001	10 1 29	6 1754	9 29 20	11 14 5	7 5 42	1 7 58	1 0 34	2 20 5
24 hrs motion	11	1257	(-) 1 09	0 41	0 31	(4	0 2	(-) 0 1
Log 0f24 hrs Motion	1.3730	0.2679	1.319	1.54	1.6670	2.5563	2.8573	3.1584
+Iog of Time interval*	0.2213	0.2213	0.221 3	0.22 13	0.2213	0.2213	0.2213	0.2213
Total	1.5943	0.4892	1.540	1.76	1.8883	2.7776	3.0786	3.3797
Nearest tigure given in table	1.5902	0.4890	1.545	1.76	1.8796	2.8573	3.1584	3.1584
Taking anti-log we get the motion till time of birth	0°37'	7°47'	(-) 0°41'	0°25	0°19'	0°2'	0°01'	(-)0°01
Add reference position	10 1 29	6 1754	9 29 20	11 14 54	7 5 42	1 7 58	1 0 34	2 20 51
	10s 2° 06'	6s 25° 41'	9" 28° 39'	11"	7" 6° 01'	1" 8° 00'	IS 0° 35'	2s 20°